What is claimed is:

1. A method for etching an anti-reflective coating (ARC) layer on a substrate in a plasma processing system comprising:

introducing a process gas comprising N_xO_y, wherein x and y are integers greater than or equal to unity;

forming a plasma from said process gas in said plasma processing system; and

exposing said ARC layer on said substrate to said plasma.

2. The method as recited in claim 1, wherein said introducing of said process gas comprises introducing at least one of NO, NO_2, and N_2O.

3. The method as recited in claim 1, wherein said introducing of said process gas further comprises introducing an inert gas.

4. The method as recited in claim 3, wherein said introducing of said inert gas comprises introducing a Noble gas.

5. The method as recited in claim 1, wherein said exposing comprises exposing said ARC layer for a first period of time.

6. The method as recited in claim 5, wherein said exposing for said first period of time comprises determining said first period of time by endpoint detection.

7. The method as recited in claim 6, wherein said determining of said first period of time by endpoint detection comprises utilizing optical emission spectroscopy.

8. The method as recited in claim 5, wherein said exposing for said first period of time is followed by exposing said substrate or said ARC layer to said plasma for a second period of time.

9. The method as recited in claim 8, wherein said exposing for said second period of time comprises exposing said substrate to said plasma for a fraction of said first period of time.

10. A method of forming a bilayer mask for etching a thin film on a substrate comprising:

forming said thin film on said substrate;

forming an anti-reflective coating (ARC) layer on said thin film;

forming a photoresist pattern on said ARC layer; and

transferring said photoresist pattern to said ARC layer by plasma etching said ARC layer using a process gas comprising N_xO_y, wherein x and y are integers greater than or equal to unity.

11. The method as recited in claim 10, wherein said using of said process gas comprises using at least one of NO, NO_2, and N_2O.

12. The method as recited in claim 10, wherein said using of said process gas further comprises using an inert gas.

13. The method as recited in claim 12, wherein said using of said inert gas comprises using a Noble gas.

14. The method as recited in claim 10, wherein said transferring is performed for a first period of time.

15. The method as recited in claim 14, wherein said transferring for said first period of time is determined by endpoint detection.

16. The method as recited in claim 15, wherein said determining of said first period of time by endpoint detection comprises utilizing optical emission spectroscopy.

17. The method as recited in claim 14, wherein said transferring for said first period of time is followed by plasma etching said substrate or said ARC layer for a second period of time.

18. The method as recited in claim 17, wherein said plasma etching for said second period of time comprises exposing said substrate to said plasma for a fraction of said first period of time.

19. A plasma processing system for etching an anti-reflective coating (ARC) layer on a substrate comprising:

a plasma processing chamber for facilitating the formation of a plasma from a process gas; and

a controller coupled to said plasma processing chamber and configured to execute a process recipe utilizing said process gas to etch said ARC layer, wherein said process gas comprises N_xO_y, and x and y are integers greater than or equal to unity.

20. The system as recited in claim 19, further comprising a diagnostic system coupled to said plasma processing chamber, and coupled to said controller.

21. The system as recited in claim 20, wherein said diagnostic system is configured to receive a signal that is related to light emitted from said plasma.

22. The system as recited in claim 19, wherein said process gas comprises at least one of NO, NO_2, and N_2O.

23. The system as recited in claim 19, wherein said process gas further comprises an inert gas.

24. The system as recited in claim 23, wherein said inert gas comprises a Noble gas.

25. The system as recited in claim 20, wherein said controller causes said ARC layer to be exposed to said plasma for a first period of time.

26. The system as recited in claim 25, wherein said first period of time is determined by endpoint detection determined by said diagnostic system.

27. The system as recited in claim 26, wherein said diagnostic system comprises an optical emission spectroscopy device.

28. The system as recited in claim 25, wherein said first period of time corresponds to the time to etch said ARC layer and is extended by a second period of time.

29. The system as recited in claim 28, wherein said second period of time is a fraction of said first period of time.